

Impact of online learning on medical and non-medical students during COVID-19 pandemic in Shaqra University, Saudi Arabia: A comparative study

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ABSTRACT

Background: During COVID-19, the mode of education was changed completely to online, however, in medical colleges across Saudi Arabia, the lectures were a blend of online and offline (PBL, examination, clinical skills, and labs) activities. **Aims:** Our aim of this study to compare the learning outcomes in both medical and non-medical students and find out the challenges, limitations, and problems faced by medical students in the online and offline blended mode of teaching. **Methods:** After acquiring affirmative consent, 151 medical and non-medical students from Shaqra University were randomly engaged in a cross-sectional study. A classic questionnaire was created in Google Form and a virtual assessment was done. The acquired students' data was assessed using SPSS and Microsoft Excel software. **Results:** Over 85% of both medical and non-medical students chose online real-time training methods. In the COVID-19 duration, more than 80% of medical (M) and non-medical (NM) students said that virtual teaching was comparatively more difficult for them to focus on than the on-site teaching. Over 50% of both M and NM students believe that the COVID-19 epidemic damaged their grades this semester/block. Surprisingly, after receiving the vaccination, more than 80% of M and NM students expressed interest in on-site instruction. **Conclusions:** The study clinched that the online mode of education was disliked by many students regardless of the stream and are eager for offline mode of education.

Keywords: Medical, Non-medical, COVID-19, online learning, lecture, labs, grades.

1. INTRODUCTION

COVID-19, a viral ailment exacerbated by the SARS-CoV-2 virus, was designated a global pandemic on March 11, 2020, which has swept the China and the other parts of the world (Alsoufi et al., 2020; Hammerstein et al., 2021). The COVID-19 scourge has wreaked havoc on educational institutions throughout the world, affecting all students regardless of discipline (Alqurshi et al., 2020; Dhawan, 2020; Woolliscroft et al., 2020). The virus's highly contagious nature has rendered conventional lectures impossible, consequently impacting the process of medical education that focuses on lectures, bedside teaching, and health treatment (Sklar, 2020). The COVID-19 epidemic puts students with comorbidities, in addition to their families, at danger, and the educational institutions faced significant issue in delivering lectures and conducting onsite labs activities (Zalat et al., 2021). Furthermore, due to presence of COVID-19 patients in the hospitals, medical students undertaking internship got significantly less time (Tempski et al., 2021).

Establishing live streaming of online video classes with interactive conversations, as well as implementing a gamut of tools or self-study, were some of the best ubiquitously favored alternatives (Shatla et al., 2021; Abdelgeleel et al., 2021). For medical students, many universities made the recorded sessions publicly available (Mian & Khan, 2020). Starting March 8, 2020, the Saudi Arabian Ministry of Education (MOE) has ordered all Saudi Arabian schools, institutions, and academies to stop student attendance indefinitely, with virtual learning as an alternate option. With time, digital classrooms have replaced the traditional classrooms. Virtual education approaches like Blackboard and E - Learning platform render this conceivable (Alqurshi et al., 2020). Following the lockdown announcement, a change from traditional classroom instruction to virtual classrooms was necessary. The institution took several steps to guarantee that the uniform material and assessments were delivered. The videos also covered other applications for capturing lectures, such as MS PowerPoint, as well as how to convert such files into a Blackboard-compatible format.

Apart from teaching and preparation, assessment posed a significant difficulty because of the abrupt shift from traditional to virtual education (Almetwazi et al., 2020). Based on the MOE (KSA), criteria, many evaluation strategies, including open discussion tests, galleries, online multiple-choice questions, assignments, virtual demonstrations, mini-projects, and debate platforms, were devised, and adopted (MOE, 2020).

In this research, we will explore the negative effects of COVID-19 on M and NM students' education. In addition, we will assess the sway of the COVID-19 on clinical skills, laboratory, and problem-based learning accomplishments in M and NM institutions. We will also look at the grades of M and NM students throughout the COVID-19 period. Further, we will also study the COVID-19 effects on their social well-being, social activities, mental stress, and overall health.

2. MATERIALS AND METHODS

A cross-sectional set of questionnaires was executed among Shaqra College M and NM students in Saudi Arabia in academic year 2020-2021. For data anatomization, SPSS (version 20) and Excel software were used. The samples, which included 151 students in total, were drawn at random from students list. 91 of these students are M students, while 61 are NM students. The data were acquired employing a pre-designed self-administered questionnaire, as portrayed in Table 1 and figures.

Study duration

The research study was conducted from July 1, 2021, to December 31, 2021.

3. RESULTS

We know that during the COVID-19 pandemic, on-site sessions were cancelled, and most of the instructional activities were conducted online. We evaluated M and NM students' levels of satisfaction with various modes of instructions, teaching staff assistance, and administration throughout the COVID-19 pandemic, as indicated in Table 1. More than 70% of M students were happy (satisfied or extremely satisfied) with online in real-time (video or audio conference) modes of education, but only roughly 47% of NM students were satisfied. Most students, both M and NM, were disappointed (dissatisfied and extremely dissatisfied) with alternative modes of instructions, such as online with a video or audio recording (not in real-time), online by emailing presentations to students, written, and communication (forums, chat, etc.).

Furthermore, as shown in Figure 1, more than 85% of students from both M and NM backgrounds preferred online in real-time (video conference) modes of instructions over many other teaching approaches. It's worth noting that more than 90% of students (M and NM) used the Zoom program for E-learning (Figure 2). About 70% of the M students were happy (satisfied or extremely satisfied) with support of the teaching staff throughout the COVID-19 phase, but only about 51% of NM students were satisfied. In

addition, around 73% of the M students were happy (content or extremely satisfied) with administration's support throughout the COVID-19 period, compared to just about 55% of the NM students.

Surprisingly, nearly 50% M students agreed (strongly agree) that online classes are superior to on-campus classes, but just 8% of the NM students agreed with the M students (Table 1). Furthermore, about 60% of the M students stated (agree and strongly agree) that they had adapted successfully to the new teaching and learning experience during COVID-19 restrictions, compared to just 21% of the NM students. Throughout the COVID-19 period, more than 80% of the M and NM students stated (agree and strongly agree) that virtual teaching was more difficult for them to focus on than the on-site educational instructions.

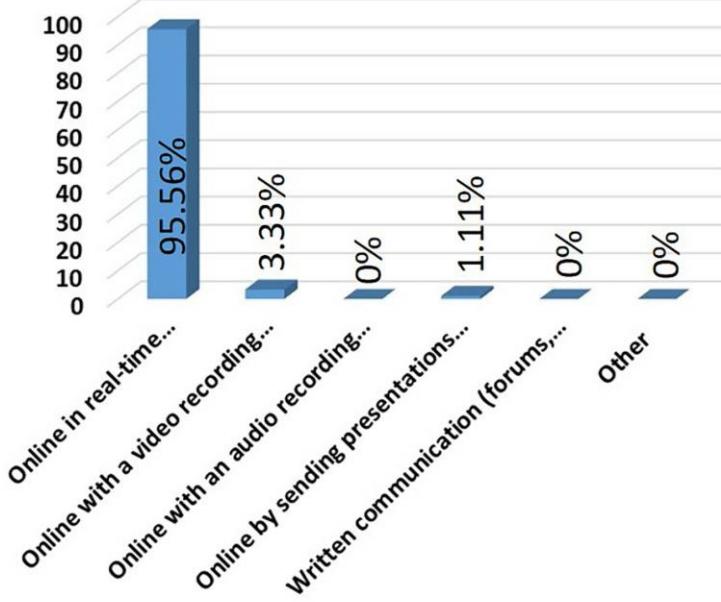
Table 1 This table depicted the many sorts of questions that were posed to medical (M) and non-medical students (NM), and their replies.

Level of satisfaction regarding different modes of teaching, support of teaching staff and administration during COVID-19 pandemic										
Questions	Satisfied		Very Satisfied		Neutral		Dissatisfied		Very Dissatisfied	
	M	NM	M	NM	M	NM	M	NM	M	NM
Online in real-time (video or audio conference)	9 (10%)	3 (4.91%)	61 (67.78%)	26 (42.62%)	4 (4.44%)	10 (16.39%)	16 (17.77%)	22 (36.06%)	0 (0%)	0 (0%)
Online with a video or audio recording (not in real-time)	8 (8.88%)	5 (8.19%)	22 (24.44%)	24 (39.34%)	43 (47.77%)	8 (13.11%)	17 (18.88%)	24 (39.34%)	0 (0%)	0 (0%)
Online by sending presentations to students	11 (12.22%)	4 (6.55%)	9 (10%)	7 (11.47%)	37 (41.11%)	8 (13.11%)	33 (36.66%)	42 (68.85%)	0 (0%)	0 (0%)
Written communication (forums, chat, etc.)	11 (12.22%)	2 (3.33%)	8 (8.89%)	8 (13.11%)	21 (23.33%)	27 (45.00%)	50 (55.56%)	24 (40.00%)	0 (0%)	0 (0%)
Since on-site classes were cancelled, how satisfied have you been with support of teaching staff?	24 (26.67%)	25 (41.67%)	44 (48.89%)	6 (9.84%)	19 (21.11%)	29 (48.33%)	3 (3.33%)	0 (0.00%)	1 (1.11%)	0 (0.00%)
Since on-site classes were cancelled, how satisfied have you been with support of administration?	26 (28.89%)	27 (45.00%)	40 (44.44%)	6 (9.84%)	5 (5.56%)	6 (10.00%)	18 (20.00%)	22 (36.67%)	1 (1.11%)	0 (0%)
Effects on educational activities and academic performance during COVID-19 pandemic										
Questions	Agree		Strongly agree		Neutral		Disagree		Strongly disagree	
	M	NM	M	NM	M	NM	M	NM	M	NM
Online classes are better than on-site classes?	36 (40.00%)	4 (6.67%)	9 (10.00%)	7 (1.48%)	7 (7.78%)	5 (8.33%)	20 (22.22%)	22 (36.67%)	18 (20.00%)	23 (38.33%)
I have adapted well to the new teaching and learning experience COVID 19 pandemic?	45 (50.00%)	5 (8.33%)	9 (10.00%)	8 (13.11%)	4 (4.44%)	7 (11.67%)	32 (35.56%)	41 (68.33%)	0 (0.00%)	0 (0.00%)
It is more difficult for me to focus during online teaching in comparison to on-site teaching during COVID 19 pandemic?	56 (62.22%)	26 (43.33%)	22 (24.44%)	24 (39.34%)	3 (3.33%)	1 (1.67%)	4 (4.44%)	5 (8.33%)	5 (5.56%)	4 (6.67%)

My practical tutorials (PBL)/seminars/ clinical skills were affected during COVID 19 pandemic?	24 (26.67%)	26 (43.33%)	42 (46.67%)	4 (6.56%)	19 (21.11%)	26 (43.33%)	3 (3.33%)	4 (6.67%)	2 (2.22%)	1 (1.67%)
My performance as a student has improved since on-site classes were cancelled during COVID 19 pandemic?	43 (47.78%)	6 (10.00%)	5 (5.56%)	24 (39.34)	20 (22.22%)	4 (6.67%)	20 (22.22%)	26 (43.33%)	2 (2.22%)	1 (1.67%)
My performance as a student has worsen since on-site classes were cancelled COVID 19 pandemic?	16 (17.78%)	26 (43.33%)	4 (4.44%)	5 (8.20%)	24 (26.67%)	22 (36.67%)	41 (45.56%)	5 (8.33%)	5 (5.56%)	4 (6.67%)
My grades in this semester/block were affected during COVID 19 pandemic?	22 (24.44%)	26 (43.33%)	38 (42.22%)	4 (6.56%)	8 (8.89%)	6 (10.00%)	19 (21.11%)	21 (35.00%)	3 (3.33%)	4 (6.67%)
COVID-19 has no effect on my educational progress and career	4 (4.44%)	3 (5.00%)	4 (4.44%)	2 (3.28%)	41 (45.56%)	10 (16.67%)	21 (23.33%)	25 (41.67%)	20 (22.22%)	21 (35.00%)
Mental stress, health status and social life during COVID-19 pandemic										
There is high mental stress because of online classes during COVID 19 pandemic?	24 (24.67%)	27 (44.26%)	19 (21.11%)	24 (39.34%)	4 (4.44%)	3 (4.92%)	40 (44.44%)	4 (6.56%)	3 (3.33%)	3 (4.92%)
My health is affected during COVID 19 pandemic?	17 (18.88%)	25 (40.98%)	4 (4.44%)	2 (3.28%)	5 (5.56%)	5 (8.20%)	44 (48.89%)	6 (9.84%)	20 (22.22)	23 (37.7%)
I am worried about being exposed to COVID-19 during lab/clinical skills/PBL/training	34 (37.78%)	44 (73.33%)	4 (4.44%)	4 (6.56%)	6 (6.67%)	6 (10.00%)	42 (46.67%)	5 (8.33%)	4 (4.44%)	2 (3.33%)
COVID-19 affected my social wellbeing and social activities	25 (27.78%)	27 (45.00%)	54 (60.00%)	26 (42.62%)	5 (5.56%)	7 (11.67%)	3 (3.33%)	0 (0.00%)	3 (3.33%)	1 (1.67%)
Will you prefer in person teaching from this academic year after taking vaccine?	40 (44.44%)	48 (80.00%)	41 (45.56%)	5 (8.20%)	4 (4.44%)	5 (8.33%)	4 (4.44%)	0 (0.00%)	1 (1.11%)	3 (5.00%)

Medical

Which of these forms of online lectures has been the most dominant during Covid-19 Pandemic?

**Non-medical**

Which of these forms of online lectures has been the most dominant during Covid-19 Pandemic?

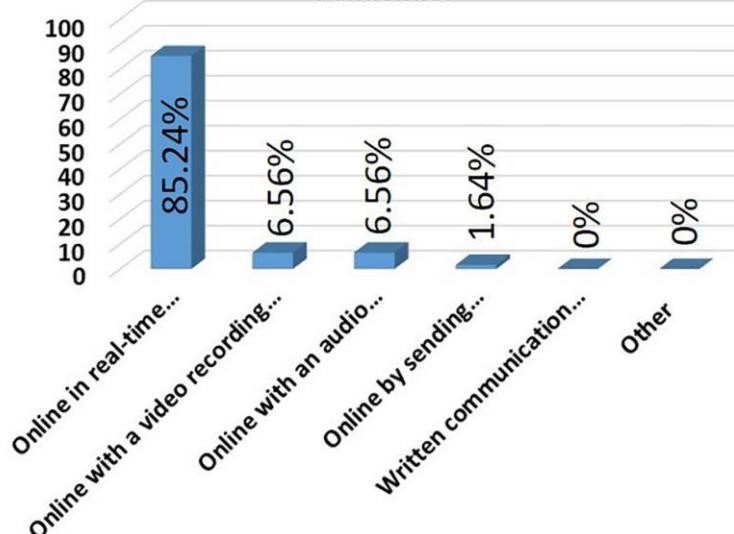


Figure 1 Diagram depicting many forms of online lectures among M and NM students.

Through the COVID-19 contagion, over 73% of the M students and 50% of the NM students agreed that their practical tutorials (PBL)/seminars/ clinical skills were significantly hampered, as indicated in Table 3. As depicted in figure 3, only 25% M students agree that their bedside teaching skills in hospitals are highly affected and 65% students believed these tasks may be handled

during the hospital training and internship. In case of the NM students, 72% believed that their practical training was highly affected, as illustrated in Figure 3.

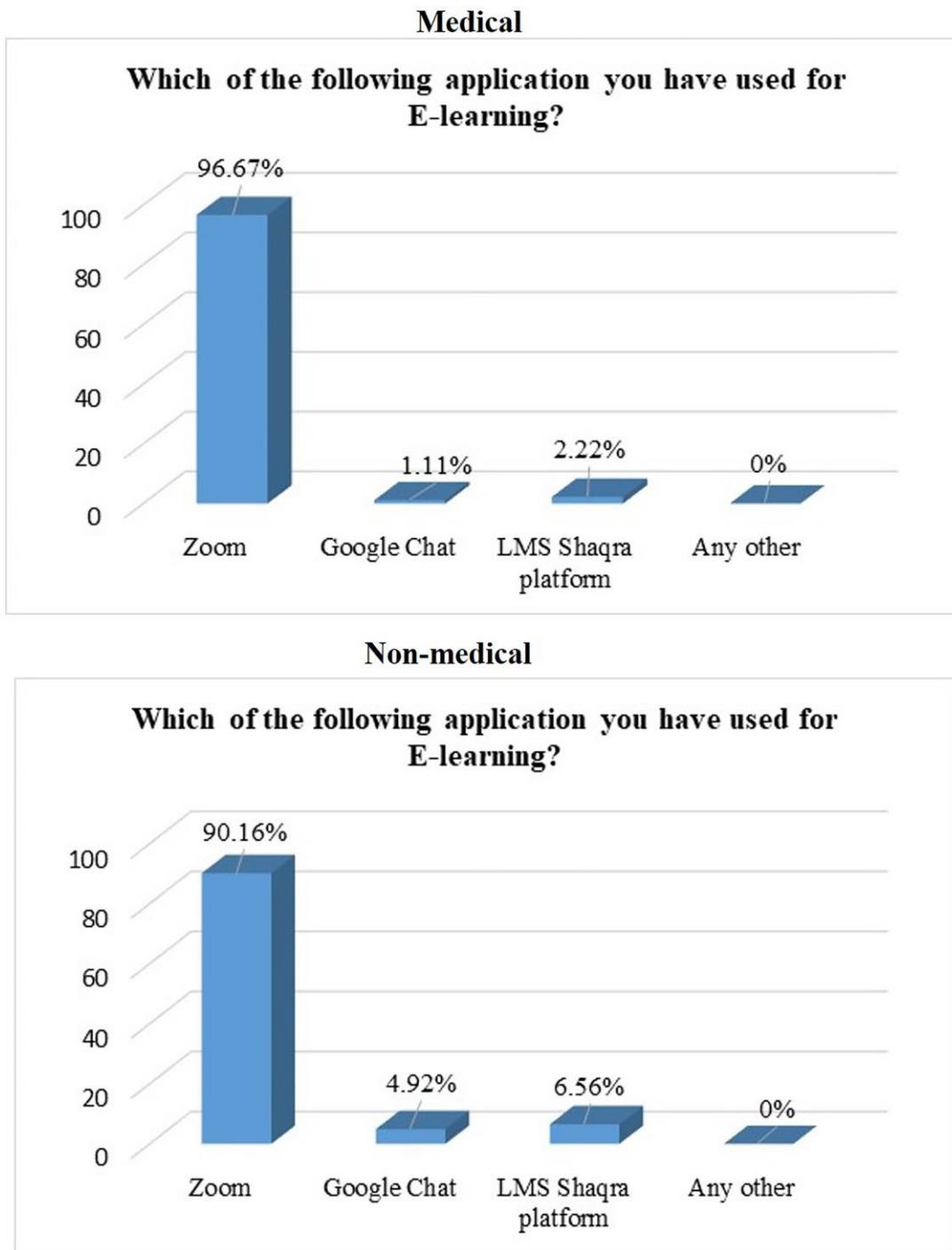


Figure 2 Diagram depicting many types of E-learning applications among M and NM students.

About 50% of the M and NM students thought that their academic performance had improved after the on-site classes were cancelled following the COVID-19 outbreak (Table 1). Furthermore, when the students were queried specifically about their grades, roughly 67% of the M students and 50% of the NM students stated that the COVID-19 had an impact on their grades this semester/block. Only 9% of the M students and 8% of the NM students believed that COVID-19 had no sway on their educational and professional goals (Figure 4). It's worth noting that just 46% of the M students believed that the online classes were causing them considerable mental stress for the duration of the COVID-19 contagion, but 84% of the NM students concurred. About 23% of the M students and 44% of the NM students alleged that COVID-19 outbreak had an impact on their health. Furthermore, roughly 42% of M students and 80% of NM students voiced concern about being subjected to COVID-19 all through lab/clinical

skills/PBL/training. Above 85 percent of M and NM students claimed that COVID-19 had a sway on their social wellbeing and extracurricular activities (Figure 5).

After receiving vaccination, the majority of M and NM students (more than 85%) agreed that they prefer in-person mode of educational instructions as quickly as possible.

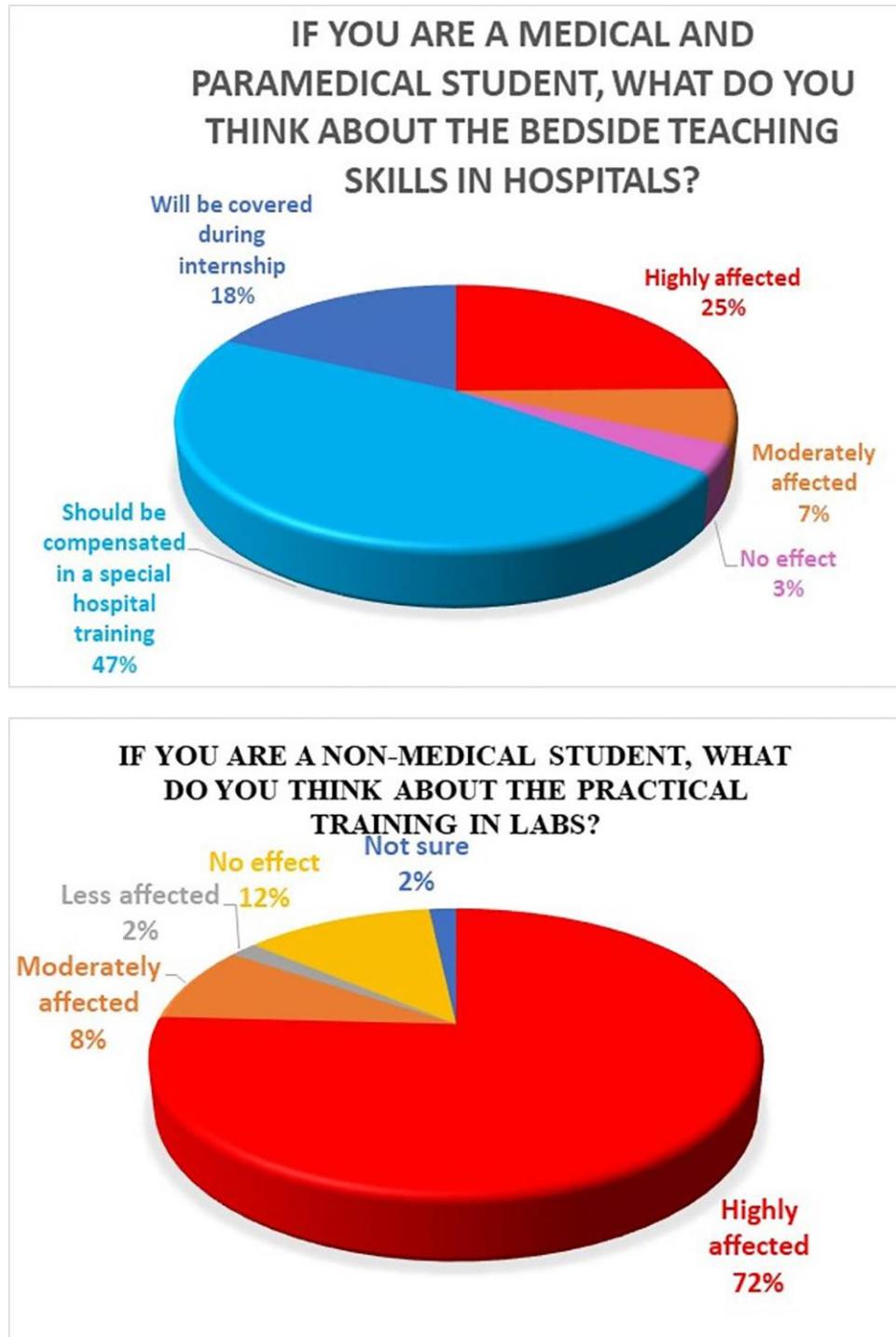


Figure 3 Graph depicting the impact of the COVID-19 pandemic among M students on hospital bedside teaching and practical lab training for NM students.

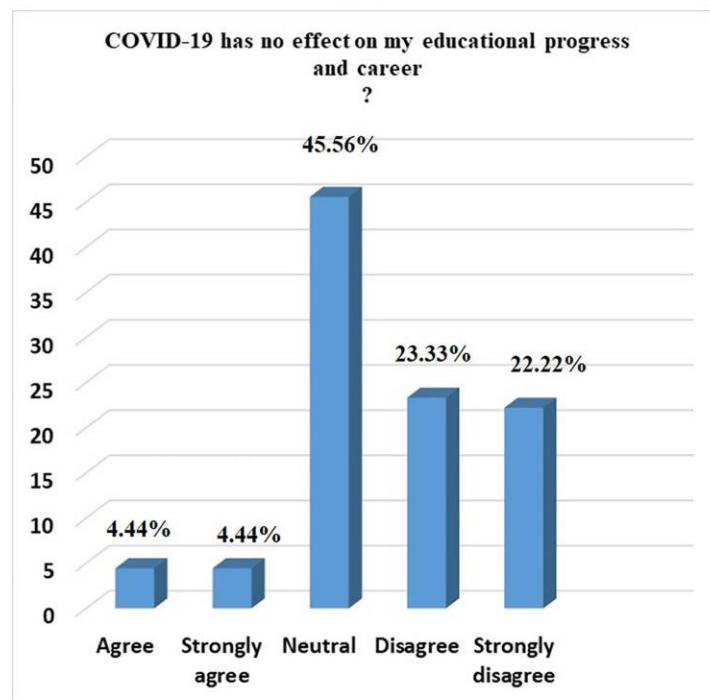
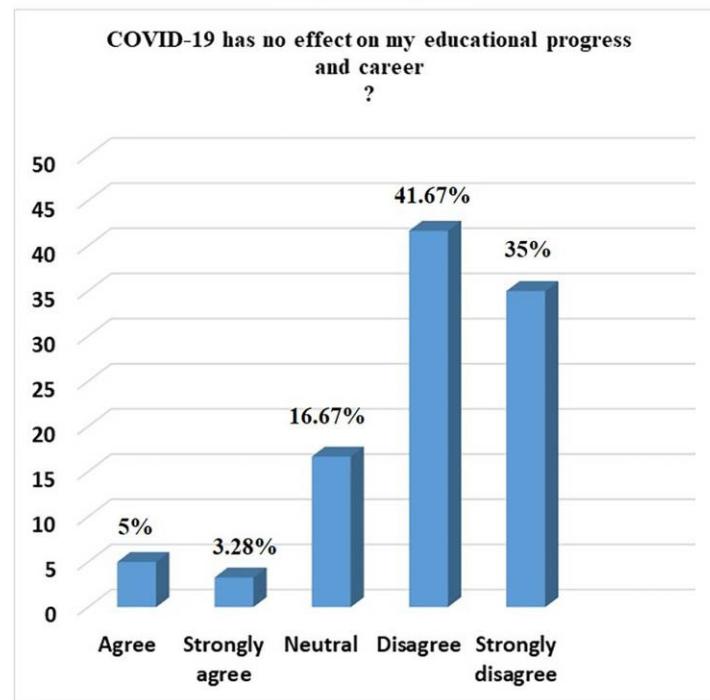
Medical**Non-medical**

Figure 4 Graph demonstrating the impact of the COVID-19 pandemic on educational advancement and carrier among M and NM students.

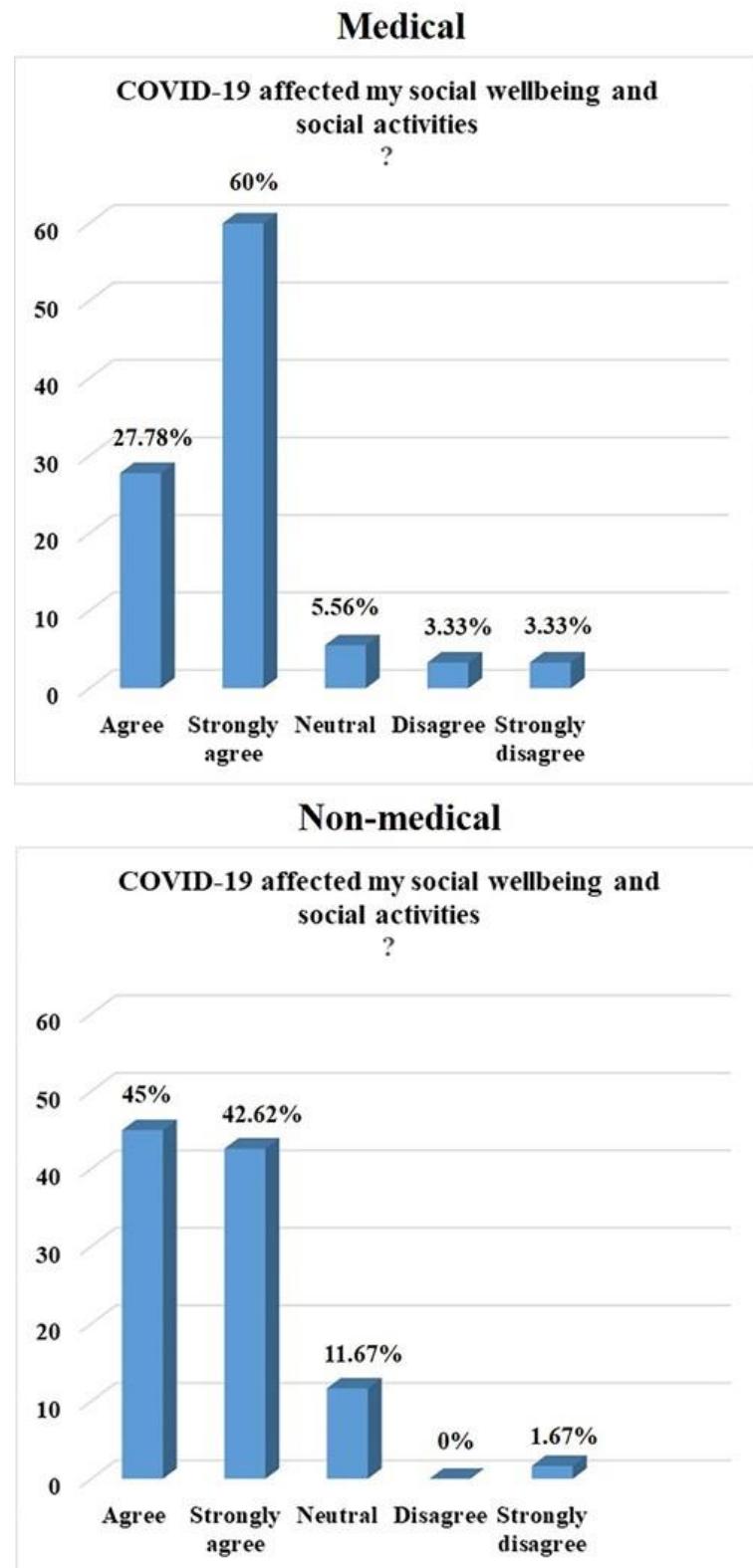


Figure 5 Influence of COVID-19 on social wellbeing and social activities among M and NM students.

4. DISCUSSION

Already many investigations have been commenced by academicians and scientists all over the globe that convey the influence of online education activities on student academic attainment (Mian & Khan, 2020). Many scientists have explored COVID-19's consequences on their social lives and health (Alsoufi et al., 2020). However, none of these researches included comparison analyses of COVID-19's effects on M and NM students' educational activities, academic performance, health status, and social lives. As a

result, we conducted this research at Shaqra University in Saudi Arabia to examine the sway of virtual education on the M and NM students in the period of COVID-19 pandemic.

Our findings revealed that online mode in real-time (video conference) was the preferred way of teaching for both M and NM students, with just a few students agreeing on alternative modalities of instructions (Figure 1). In addition, we noticed that the plurality of M and NM students employed Zoom for their E-learning (Figure 2). We utilized Zoom exclusively for our online video courses with our medical colleagues, and the results were consistent. We also looked into the sway of virtual classes on M and NM students' educational activities and academic achievement.

According to the research, just a small percentage of NM students believed that the virtual learning is superior to on-site learning, whereas over half of the M students preferred online learning to the on-site learning. The actual reason for this choice is unknown; nevertheless, we assume that some of the M students besides fear of infection also travel longer distances to attend classes, and that online class saved them time to devote it for self-study. Most M and NM students stated that throughout the COVID-19 crisis, online education was more difficult for them to concentrate than on-site teaching. A few M students believed their clinical skills/practical sessions have been negatively or significantly impacted, while the majority believed these activities may be conducted during the hospital training and internship. In case of the NM students, 80% believed that their practical training was much or moderately influenced. However, in contrast, a very low percentage of the M students believed that the clinical skills/practical sessions were substantially affected because laboratories, examinations, and other practical sessions were on-site in the college of medicine, except the lectures were online.

We also looked into how COVID-19 affected students' academic achievement. Half of the M and NM students thought that their academic performance had improved since on-site classes were cancelled in COVID-19 period. Furthermore, many M and NM students acknowledged that the COVID-19 pandemic damaged their grades in the semester/block, while a momentous number of students did not agree. The explanation might be because the exam evaluation procedures were revised as per the instructions from the administration, and consequently, many were able to pass the exam with ease. For example, in our college, we replaced the assessment techniques of modified essay questions and short assay questions with an oral exam and quiz. Nevertheless, most students assumed that the COVID-19 has harmed their educational and professional success (Figure 4).

About 23% of M students and 44% of NM students assumed the COVID-19 crisis had an influence on their health. In addition, 42% of the M students and 80% of the NM students were afraid off contracting COVID-19 infection during lab/clinical skills/PBL/training. Furthermore, only 46% of medical students itemised that they were experiencing severe mental stress because of online lessons in COVID-19 outbreak, whereas 84% of the NM students agreed. The reasons for these results are unclear, and further investigation with a bigger data set is warranted. The bulk of the M and NM students stated that COVID-19 had an impact on their social wellness and social activities (Figure 5), and they preferred in-person educational instruction as soon as possible after receiving the vaccination.

5. CONCLUSION

In conclusion, despite the study's small sample size, it raised numerous important issues about COVID-19's overall clout on students' education, comprehension, mental, and general health, independent of their academic stream. A larger study with specific questions is needed to provide a better comprehension of the long negative effects on professional education and academic accomplishment.

Abbreviations

Medical (M), non-medical (NM), Ministry of Education (MOE)

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Author contributions

MH, KSA, OA, MA, BS, FAA, MI, FSA, SHA, ARA, AMA: Data collection, analysis, interpretation of data. JMA: Data analysis, supervision of work, writing and editing of MS. AA: Data analysis, writing and editing of MS, figure and table preparation and supervision of work.

Consent

All the authors who took part in this survey gave their consent.

Ethical approval

The ethical approval committee of the College of Medicine at Shaqra, Shaqra University, Saudi Arabia (SUCOM/LIRB/2021-22) granted their approval to this study.

Declaration

All the authors have read and approved the manuscript, and all of the authorship requirements have been satisfied. Each author thinks that the manuscript represents honest work.

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Conflicts of interest

The authors declare that there are no conflicts of interests.

Data and materials availability

All data associated with this study are present in the paper.

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